Child Health and Functional Well-Being

in Changing Social Contexts

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Abstract

Child health develops through the ongoing interaction of daily habits, relational contexts, and developmental processes that shape how children move, feel, and participate in their environments. When social structures were abruptly disrupted in 2020, these interactions were reorganized in ways that continue to influence sleep patterns, physical activity, and forms of social engagement. In pediatric practice, the consequences of these changes rarely present as clearly defined diagnoses. More often, they appear as overlapping concerns such as fatigue, reduced tolerance to physical effort, emotional irritability, or slowed engagement in everyday activities, challenging compartmentalized approaches to clinical interpretation.

This review moves away from rigid categorical frameworks and examines child health through a functional perspective, drawing on scientific evidence published up to 2022. Rather than asking whether a child meets criteria for a specific condition, the analysis centers on how children function within their reorganized daily lives. By integrating perspectives from pediatrics, movement sciences, and psychology, we argue that clinical success is better understood in terms of participation in play, social interaction, and physical activity than through the mere absence of disease. The available evidence indicates that declines in activity and sleep quality, together with expanded digital engagement, have reshaped patterns of social participation. These changes call for a reorientation of developmental support and functional recovery strategies that is grounded in everyday functioning and responsive to ongoing social change.

Keywords

child health, functional well-being, daily habits, child development, physical activity, emotional regulation, sedentary behavior, social context

Executive Summary

Background: Child health is shaped by the continuous regulation of movement, emotional states, and social participation within everyday environments. Daily habits such as physical activity, sleep routines, and patterns of interaction provide the structure through which development is organized across childhood. Periods of sustained social disruption have altered these structures in uneven and lasting ways. In clinical practice, the consequences of these changes are increasingly encountered not as clearly defined diseases but as diffuse functional difficulties that cross physical, emotional, and behavioral domains. Pediatric consultations now frequently involve concerns related to fatigue, reduced tolerance to physical effort, emotional dysregulation, and difficulties sustaining participation in school or social activities, challenging traditional compartmentalized approaches to assessment and care.

Gap: Most analyses addressing child health after large-scale social disruption have focused on specific outcomes such as emotional symptoms, physical inactivity, or screen use, often examining these dimensions in isolation. This fragmentation limits understanding of how daily habits, bodily regulation, and emotional processes interact over time. Clinical responses face a parallel difficulty, with assessments frequently shifting between biological exclusion and psychological explanations when symptoms do not align with established diagnostic categories. What remains insufficiently developed is an integrated account of how functional changes arise from the reorganization of everyday environments and how the absence of a shared clinical reference continues to hinder coherence between pediatric, movement-related, and psychological perspectives.

Purpose: This article examines child health following sustained social disruption through a functional and developmental lens. Observed changes are approached as expressions of reorganized daily life rather than as isolated pathological outcomes. The aim is to articulate a coherent clinical perspective that brings together pediatric, kinesiology, and psychological contributions while preserving the specificity of each field. By placing functionality and participation in daily activities at the center of

analysis, the paper seeks to clarify how physical conditioning, emotional regulation, and contextual factors interact, and how this interaction can guide proportionate clinical assessment and preventive strategies.

Methodology: An integrative review of literature published up to 2022 was conducted, drawing on systematic reviews, meta-analyses, clinical guidelines, and consensus documents addressing physical activity, psychomotor development, emotional well-being, sleep, and daily habits in pediatric populations. Rather than aggregating quantitative outcomes, the analysis focused on recurring patterns interpreted within a developmental and biopsychosocial framework. This approach prioritizes functional relevance and clinical interpretability over prevalence estimation or causal attribution. No original empirical data are presented.

Results: Across the reviewed literature, sustained changes in daily habits emerge as a consistent pattern, particularly reductions in physical activity and disruptions to sleep routines. Reported trajectories are heterogeneous and vary according to age, family resources, and environmental supports. Functional consequences commonly include reduced tolerance to physical effort, emotional reactivity, and diminished participation in school and social activities. The evidence also points to overlap between habit-related changes and persistent postinfectious symptoms, complicating attribution. In many cases, these difficulties appear to represent adaptive responses to reorganized environments that become clinically relevant when they persist and interfere with everyday functioning.

Conclusion: Child health following sustained social disruption cannot be adequately understood through isolated symptom categories or single-domain explanations. The evidence supports a shift toward clinical reasoning grounded in functionality, development, and context. Aligning pediatric, movement-related, and psychological perspectives around participation in daily life allows clinicians to interpret diffuse presentations more coherently and to design proportionate, sustainable responses. Effective care in this setting depends less on narrow diagnostic labeling and more on restoring balanced routines, supporting gradual reconditioning, and providing consistent guidance across home, school, and clinical environments.

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Chapter 1

Introduction

Child health develops within a dense and often uneven network of daily routines, relationships, and material conditions that shape how children explore their bodies and their social worlds. These elements do not operate as separate or sequential factors. They form an interdependent system in which habits and environments gradually steer developmental pathways, often in ways that are not easily captured by standard clinical checklists. When everyday life is disrupted, the effects therefore tend to appear less as isolated symptoms and more as shifts in functionality and well-being that cut across established disciplinary boundaries.

The sociosanitary crisis that began in 2020 represented more than a temporary interruption of routines. It involved a structural reorganization of family life and educational settings that continues to influence how children move, rest, and relate to others. Even after the most restrictive measures were lifted, many changes in physical activity, sleep patterns, and digital engagement remained embedded in daily life. In clinical practice, the consequences of this period are now encountered in presentations marked by diffuse complaints, reduced tolerance to physical effort, and difficulties with emotional regulation. These presentations rarely allow for simple explanations and often resist straightforward categorization.

In this context, compartmentalized interpretations of child health have shown clear limitations. Approaches focused solely on biological pathology risk overlooking the functional impact of altered environments, while exclusively psychological readings may miss the role of bodily deconditioning and the developmental need for movement and play. The coexistence of physical and emotional manifestations calls for a shift away from the search for a single cause toward frameworks that can accommodate the multiple dimensions of child development. This article presents an integrative review of literature published up to 2022 with the aim of building a coherent bridge between pediatrics, kinesiology, and psychology. Rather than treating observed changes as fixed pathological outcomes, we examine how reorganized habits and relational dynamics

interact with bodily and emotional regulation. Through a biopsychosocial perspective, we argue for clinical assessment grounded in functionality and proportional intervention, where success is understood in terms of the child's capacity to participate meaningfully in everyday life.

Chapter 2

Conceptual foundations of child health and development

Understanding child health requires conceptual models that capture the continuous interaction between biological processes, everyday practices, relational environments, and broader social conditions. From a pediatric standpoint, this interaction becomes visible in the way children respond to effort, adapt to routine changes, and maintain physiological regulation across the day. Development does not progress through isolated domains. It unfolds through embodied experiences and regulated routines that take shape within family organization, educational settings, and access to social and physical spaces. When these contexts shift, the consequences extend beyond individual symptoms and become visible in how children function, regulate themselves, and participate in daily life.

Recent disruptions to everyday life have made the limits of narrowly framed clinical perspectives more evident. In kinesiology, for instance, these limits appear when reduced variability of movement or diminished motor confidence cannot be explained solely by physical conditioning. Psychological perspectives encounter a similar challenge when emotional expressions reflect not only internal states but also the erosion of relational anchors and predictable routines. Approaches that privilege a single dimension often fail to account for presentations in which physical, emotional, and contextual factors overlap without fitting clearly into established diagnostic categories.

These situations demand interpretive frameworks capable of holding complexity without fragmenting the child into separate problems. In this section, we outline the conceptual foundations that guide the present analysis, treating child health as a situated developmental process and placing functionality at the center of clinical understanding across disciplines. This shared focus allows medical, motor, and psychological perspectives to contribute their specific insights while converging on the child's capacity to participate meaningfully in daily life.

2.1 Development within environmental and relational contexts

Child development takes shape through constant interaction between the child and both immediate and extended environments. Biological maturation sets the groundwork, but it does not operate in isolation. Developmental trajectories are strongly influenced by the stability of everyday routines, the quality of relational exchanges, and the availability of opportunities for exploration and play. Family organization, schooling, peer relationships, and neighborhood conditions contribute in different ways across stages of development, shaping cognitive, emotional, and motor capacities through patterns that may support resilience or increase vulnerability.

When these contexts change abruptly or remain altered over time, development tends to reorganize rather than come to a halt. In some children, this reorganization facilitates adaptation. In others, it gives rise to functional difficulties, depending on the presence of protective factors and the supports available. From a clinical standpoint, changes in behavior, mood, or physical performance are better understood within the broader ecology of the child's life, rather than interpreted as isolated departures from an expected norm.

Reductions in social interaction or active play, prolonged time spent in constrained environments, and shifts in caregiver availability can disturb the balance between stimulation and regulation that supports healthy development. These effects usually accumulate gradually. Over time, they influence how children relate to their bodies, regulate emotional states, and engage with others. Recognizing development as cumulative and context-dependent reinforces the value of assessment approaches that attend to everyday environments and routines alongside individual symptoms.

2.2 The biopsychosocial model in pediatric practice

The biopsychosocial model offers a useful way of understanding child health as the result of interacting biological, psychological, and social processes, rather than as the outcome of a single causal pathway. In pediatric practice, this perspective is especially relevant because development is ongoing and children depend heavily on external structures to regulate behavior, emotion, and physiological states. Presentations such as fatigue, pain, irritability, or attentional difficulties often arise where bodily processes, emotional responses, and environmental demands converge, particularly in contexts marked by disrupted routines or sustained stress.

Adopting a biopsychosocial perspective does not mean minimizing biological as-

sessment or redefining symptoms as psychological by default. It supports a form of clinical reasoning that considers how physical deconditioning, emotional load, and contextual pressures may combine to produce functional limitations. This orientation allows interventions to be calibrated with greater precision, addressing daily habits, environmental conditions, and coping resources alongside medical or psychological care when indicated, instead of relying on narrowly framed or exclusion-based responses (Engel, 1977).

2.3 Functionality and daily habits in clinical assessment

Functionality provides a concrete clinical reference around which different disciplinary perspectives can converge. In childhood, it refers to the child's capacity to participate in everyday activities appropriate to their developmental stage. This includes school attendance, play and movement, social interaction, sustained attention, and emotional regulation across daily settings. Changes at this level often become apparent before clear diagnostic patterns emerge, which makes functional assessment especially informative when well-being is compromised without an obvious pathological correlate.

Everyday habits play a central role in shaping functional capacity. Sleep routines, levels of physical activity, sedentary behavior, and patterns of screen use are closely interrelated and influence both bodily regulation and emotional stability. When these habits lose balance or consistency, children may show reduced tolerance to physical effort, disrupted sleep, heightened emotional reactivity, or difficulties maintaining engagement in academic and social contexts. Framing clinical assessment around functionality and daily habits allows pediatrics, kinesiology, and psychology to share a common reference while preserving their specific perspectives. This focus supports coordinated evaluation and proportionate intervention strategies that emphasize feasibility, gradual adjustment, and alignment with the child's developmental stage and family environment (World Health Organization, 2019).

Chapter 3

Reorganization of child developmental environments

Periods of sustained social disruption reshape the environments in which children grow, learn, and regulate everyday life. These changes rarely function as isolated events. Instead, they accumulate over time and modify routines, expectations, and opportunities for interaction and movement. In childhood, where development relies heavily on environmental stability and relational continuity, shifts in family organization, schooling, and social life tend to leave functional traces that persist beyond the initial disruption. In this section, we examine how the reorganization of developmental environments following a sociosanitary disruption influenced children's daily contexts, with particular attention to routine structures and the wide range of adaptive trajectories observed across social and family settings.

3.1 Changes in family routines and educational settings

Family routines provide the temporal and relational structure that supports regulation, learning, and emotional security during childhood. When daily schedules, caregiver availability, or household organization are disrupted, patterns of sleep, activity, and social engagement often change in ways that extend beyond the immediate crisis. During and after the sociosanitary disruption that began in 2020, many families experienced sustained modifications in work arrangements, caregiving roles, and overall stress levels. These shifts influenced children's access to structured activities, shared meals, and consistent bedtime routines. At the same time, increased time spent indoors and reduced access to outdoor play and organized physical activity further altered the rhythm of daily life.

Educational environments also underwent major reconfiguration. Interruptions to in-person schooling, the adoption of hybrid formats, and changes in classroom dynamics affected not only academic learning but also socialization and daily structure. Schools play a central role in organizing children's time, movement, and peer interaction. Partial or prolonged disruption of this role reduced opportunities for physical activity, informal play, and everyday emotional exchange with peers. Even after face-to-face education resumed, many systems retained modified schedules, altered expectations, or reduced support services. In several contexts, this contributed to a lingering sense of discontinuity in children's developmental environments.

Changes in family life and educational settings rarely occurred in isolation. They interacted and, in many cases, reinforced one another. For some children, increased parental presence allowed for adaptive reorganization and stronger relational support. For others, heightened household stress combined with reduced external structure led to less predictable routines and diminished functional engagement. Making sense of these divergent trajectories requires attention to the relational and temporal organization of daily life, rather than a narrow focus on individual behaviors taken out of context.

3.2 Persistence of habits and diversity of developmental trajectories

A central feature of the period following social disruption has been the durability of habits formed under altered conditions. In many children, increased sedentary time, heavier use of digital media, and irregular sleep schedules did not fade once restrictions eased. Instead, they became part of everyday life. This persistence was not uniform. Its expression and consequences differed according to age, developmental stage, family resources, and access to environments that could support reorganization.

Adaptive trajectories emerged from the interaction between individual characteristics and contextual conditions. Access to safe outdoor spaces, the availability of structured activities, parental time and emotional availability, and support within schools all influenced how quickly and in what direction daily routines were reorganized. Younger children tended to depend more directly on caregiver-mediated structures, making family routines especially influential. Adolescents, by contrast, navigated change through shifts in autonomy and peer relationships, with distinct effects on emotional regulation and physical engagement.

This variability highlights the limits of generalized assumptions about developmental impact. The reorganization of daily environments did not produce a single or

predictable outcome. Instead, it gave rise to multiple pathways that ranged from a gradual return to previous routines to the persistence of functional difficulties. Clinical interpretation therefore needs to remain closely attuned to context. Similar behaviors may reflect very different underlying processes depending on environmental constraints and available supports, as well as timing, intensity, and duration of exposure to change. Focusing on developmental trajectories rather than isolated observations supports more accurate assessment and helps guide interventions that are better aligned with each child's lived experience, adaptive capacity, and functional needs across settings.

Chapter 4

Movement and corporeality in child development

Movement is a core dimension of child development. Through bodily activity, children explore their surroundings, acquire motor competence, regulate physiological states, and connect with others. These processes unfold simultaneously. Movement in childhood is not confined to physical skill acquisition but is closely linked to emotional regulation, cognitive engagement, and social participation. When opportunities for movement are reduced or reshaped, as has occurred during periods of sustained social disruption, the consequences extend beyond physical fitness and become visible in everyday functioning and well-being. In this section, we focus on movement and corporeality as central elements of development, with particular attention to their functional meaning and the importance of interpreting change in a way that is sensitive to age, context, and lived experience.

4.1 The role of movement in pediatric health

Regular movement supports multiple dimensions of pediatric health, including cardiovascular fitness, musculoskeletal development, metabolic balance, and sleep quality. At the same time, it offers children repeated opportunities to engage with effort, experience mastery, and regulate their own responses. These experiences contribute to emotional stability and a sense of competence. In daily life, spontaneous play, active ways of moving through the environment, and structured physical activities come together to shape movement patterns. When these elements are present, they help maintain a balance between activity and recovery that supports participation across settings.

When access to movement is restricted or becomes less varied, this balance can gradually shift. Children may begin to tire more quickly, show reduced endurance, or report discomfort during activities that were previously manageable, even when clin-

ical examination does not reveal abnormalities. Such changes do not automatically signal pathology. They often reflect deconditioning and a recalibration of perceived effort after prolonged changes in routine. Reading these manifestations through a developmental and functional lens allows clinicians to separate transient adaptations from situations that require further evaluation. This approach supports responses that remain proportionate and grounded in the child's everyday functioning rather than driven solely by exclusion of disease (Neville et al., 2022).

4.2 Psychomotor development and active play

Psychomotor development depends on repeated and varied opportunities for active play, exploration, and engagement with both physical and social environments. Through play, children gradually refine coordination, balance, strength, and spatial awareness. At the same time, they participate in symbolic and relational experiences that support emotional expression and cognitive growth. Active play also helps children become familiar with physical effort, allowing them to modulate exertion and recover during everyday activities.

When opportunities for active play are reduced, changes often appear in how children move and participate. Motor confidence may decline, movement patterns can become more restricted, and tolerance for sustained activity may decrease. These shifts can affect participation at school and during leisure time, sometimes leading to avoidance of physical engagement that further limits functional capacity. Restoring access to age-appropriate movement and play becomes especially relevant after periods in which environmental conditions have narrowed children's daily experiences. Supporting psychomotor development in these contexts requires attention to opportunity, variety, and gradual reengagement rather than an exclusive focus on performance deficits.

4.3 Sedentary behaviors, screen exposure, and functional considerations

Sedentary behaviors and screen use have become a central component of many children's daily routines, particularly when opportunities for movement are limited. Digital media can support learning and social connection, but extended periods of inactivity may reduce time spent in activities that contribute to physical conditioning and emotional regulation. From a functional perspective, prolonged sitting raises questions related to postural comfort, musculoskeletal load, and sustained attention over the course of the day.

The association between screen exposure and physical discomfort in children is not straightforward and varies across contexts. A functional reading avoids isolating screen use as a single causal factor. Instead, it considers how movement, rest, posture, and variation are distributed throughout daily routines. Attention to regular breaks, changes in position, and the presence of active play helps shift the focus away from restriction and toward balance. This orientation supports practical guidance aimed at restoring variability, movement, and bodily awareness in everyday life, rather than relying on simplified explanations that overlook the broader context of children's functioning (Sirajudeen et al., 2022).

Chapter 5

Emotional regulation and psychological well-being in childhood

Emotional regulation in childhood develops through the continuous interplay of biological maturation, relational experiences, and daily routines that offer stability and predictability. Psychological well-being cannot be understood apart from the environments in which emotions are expressed, supported, and given meaning. When these environments are disrupted over time, patterns of stress exposure change, relational availability may decrease, and opportunities for emotional co-regulation can be reduced. In this section, we approach emotional regulation and psychological well-being from a developmental and contextual perspective, highlighting how emotional expressions are closely linked to everyday habits, movement experiences, and social participation.

5.1 Sustained social stress and emotional manifestations

Prolonged exposure to social stress can influence children's emotional responses and coping styles in ways that are not always immediately evident. Disruptions to routines, ongoing uncertainty within family systems, and reduced access to familiar sources of support can heighten emotional reactivity or lead to irritability and withdrawal. In some children, stress becomes visible through anxiety-related expressions, changes in mood, or difficulties sustaining attention. In others, it appears through somatic complaints or shifts in behavior. These manifestations often represent adaptive responses to altered circumstances rather than clearly bounded psychological disorders, especially when stressors persist over time.

Placing emotional symptoms within this wider context allows clinicians to distin-

guish temporary challenges in regulation from more enduring difficulties that may call for specific intervention. Emotional expressions acquire clinical relevance when they begin to limit everyday functioning, interfere with social participation, or affect learning. For this reason, assessment gains depth when emotional regulation is considered in relation to functional capacity and daily life, rather than evaluated as an isolated domain (Racine et al., 2021).

5.2 Social bonds, peer interaction, and experiences of isolation

Peer relationships occupy a central place in emotional development. Through interaction with peers, children share experiences, negotiate differences, and gradually build social competence. When these interactions are disrupted, the effects extend beyond temporary frustration and can affect a child's sense of belonging and emotional security. This is especially evident when alternative forms of social contact are limited, irregular, or lack continuity. Under such conditions, experiences of reduced peer contact or isolation may be accompanied by feelings of loneliness, lower motivation, and changes in how children perceive themselves in relation to others, with clear implications for emotional well-being.

The impact of altered peer interaction is not uniform and varies according to developmental stage and individual characteristics. Younger children often express distress through changes in play behavior, increased dependence on caregivers, or shifts in attachment-related responses. Older children and adolescents may be more sensitive to social exclusion and may experience reduced opportunities for exploration of identity and autonomy. Attending to these developmental differences is essential for meaningful clinical interpretation and for guiding processes of social reengagement as opportunities for peer interaction are gradually restored (Loades et al., 2020).

5.3 Sleep, physical activity, and emotional regulation

Sleep and physical activity play a central role in emotional regulation during childhood. Both contribute to the modulation of arousal, stress reactivity, and cognitive functioning. When sleep routines are disrupted or levels of physical activity decline, emotional regulation can become more fragile. Fatigue, irritability, and reduced motivation may begin to reinforce one another, creating patterns that are maintained over time through everyday habits rather than through isolated events. These dynamics highlight how closely emotional well-being is tied to the organization of daily life.

Approaches to emotional regulation therefore benefit from an integrated view that considers sleep quality, movement patterns, and environmental supports alongside psychological processes. Efforts to reestablish consistent sleep routines and to reintroduce regular physical activity often lead to noticeable improvements in emotional stability and everyday functioning. Rather than targeting symptoms in isolation, this perspective emphasizes the role of balanced daily routines as a foundation for emotional well-being and aligns with broader guidance that situates child health within the rhythms and structures of daily life (World Health Organization, 2019).

Chapter 6

Clinical integration in pediatric practice

Clinical presentations in childhood often emerge at the intersection of bodily processes, emotional states, and everyday contexts. When routines shift, opportunities for movement diminish, or relational environments lose predictability, children rarely present with neatly circumscribed symptoms. Instead, they show diffuse and overlapping difficulties that affect functioning across settings. In such situations, parallel clinical approaches that do not communicate tend to produce partial interpretations and fragmented interventions. Functional capacity offers a shared reference point that allows pediatric, movement-related, and psychological perspectives to inform one another while maintaining their disciplinary specificity.

6.1 Limitations of monocausal interpretations

Single cause explanations tend to flatten complex clinical presentations by forcing them into one dominant explanatory domain. In pediatric practice, this often translates into an exclusive focus on biological findings, followed by a rapid shift toward emotional or behavioral interpretations when examinations and tests do not reveal clear abnormalities. Both moves can be misleading when changes in daily functioning emerge from the interaction of multiple processes unfolding over time.

From a movement oriented perspective, monocausal reasoning obscures how reduced variability, physical deconditioning, and altered perceptions of effort gradually reshape a child's tolerance to activity. These changes are rarely abrupt and often develop quietly, becoming visible only when participation in play or school activities begins to decline. Psychological perspectives encounter a parallel difficulty when emotional expressions are interpreted without considering the erosion of routines, the loss of predictable anchors, or shifts in relational availability that accompany broader envi-

ronmental change.

Presentations such as fatigue, pain, irritability, or reduced tolerance to effort rarely originate from a single source. They tend to reflect cumulative influences that reinforce one another and gain clinical relevance through their impact on everyday life. When these manifestations are examined in isolation, relevant contributors may remain unaddressed and interventions lose coherence. Moving beyond monocausal reasoning allows symptoms to be read as meaningful expressions within a broader functional system, supporting clinical responses that are proportionate, integrated, and more closely aligned with the child's lived experience (Engel, 1977).

6.2 Functional assessment as a shared clinical language

Functionality provides a practical and integrative reference that enables different clinical perspectives to converge without losing their distinct contributions. In childhood, functional assessment focuses on how the child manages everyday activities in relation to age and context, including participation in school life, engagement in play and movement, emotional regulation, and social interaction. Changes in these areas often become visible before isolated symptoms form a clear diagnostic pattern, particularly when daily environments have been reorganized.

From a medical standpoint, functional assessment situates physiological findings within the rhythm of daily life. From a movement perspective, it highlights patterns of activity, posture, and tolerance to effort as they unfold across the day. From a psychological viewpoint, it clarifies how emotional regulation and relational dynamics shape engagement and participation. When functionality serves as a shared reference, these perspectives complement rather than compete with one another, contributing to a more comprehensive understanding of the child's experience (World Health Organization, 2019).

6.3 Articulation of clinical perspectives in practice

Clinical integration does not require blending disciplines or weakening professional boundaries. It involves articulating distinct forms of expertise around shared aims related to the child's functioning and well being. Medical assessment contributes developmental orientation and the identification of warning signs that warrant further investigation. Movement focused evaluation addresses bodily competence, confidence,

and the process of reconditioning. Psychological input clarifies emotional meaning, stress responses, and contextual influences on behavior.

Integration becomes tangible when care plans are coordinated around realistic goals and coherent strategies. Restoring daily routines, supporting a gradual return to movement, strengthening emotional regulation, and offering guidance to caregivers and educators often form part of this process. When clinical perspectives are aligned through a functional focus, care is more likely to be experienced by children and families as consistent and supportive, facilitating adherence and increasing the likelihood of meaningful clinical change over time.

Chapter 7

Methodology

This article adopts an integrative review design to examine evidence on child health, movement, and psychological well-being in contexts of sustained social disruption. Rather than testing a single causal hypothesis, we sought to bring into dialogue developmental, clinical, and functional dimensions that are frequently addressed in isolation. An integrative approach was selected because it allows heterogeneous sources to be considered together while preserving clinical relevance, particularly in areas where quantitative findings require careful developmental and contextual interpretation.

The review encompassed literature related to pediatric health, physical activity and sedentary behavior, psychomotor development, emotional regulation, psychological well-being, sleep routines, screen exposure, and functional outcomes in children and adolescents. Our selection prioritized work that explicitly addressed changes in everyday routines, access to movement opportunities, and social environments following large-scale disruption to daily life. Systematic reviews, meta-analyses, clinical guidelines, and consensus statements formed the core of the evidence base, complemented by conceptual models that situate child development within biopsychosocial and ecological frameworks.

Searches were conducted in major biomedical and psychological databases commonly used in pediatric and public health research, including PubMed and PsycINFO, with supplementary searches in multidisciplinary sources such as Scopus. Search strategies combined descriptors of pediatric populations with terms related to habits, functioning, and well-being, alongside terms referring to large-scale social disruption. Typical combinations paired child, adolescent, or pediatric with physical activity, sedentary behavior, sleep, screen time, mental health, anxiety, depression, well-being, and functional outcomes, together with disruption-related terms including pandemic, lockdown, and COVID-19. Searches were performed between January and March 2023. Publications in English were prioritized, and international guidance documents

were included when directly relevant to movement, sedentary behavior, or sleep.

To preserve a stable evidentiary frame and avoid conflating this analysis with later contextual shifts, inclusion was limited to studies published up to and including 2022. Studies published after that date were excluded. Additional inclusion criteria required a primary focus on children or adolescents and explicit relevance to at least one key domain of interest, including physical activity, sedentary behavior, psychomotor development, emotional or psychological well-being, daily habits such as sleep and screen use, or functional participation in clinical or population contexts. We excluded adult-only studies, opinion pieces lacking empirical or conceptual grounding, and publications whose primary focus fell outside child development or health-related functioning.

Given the integrative intent of the review, data extraction emphasized thematic coherence and clinical meaning rather than quantitative aggregation. Findings were organized around recurring patterns observed across domains, with attention to both points of convergence and areas of variability across ages and social contexts. Instead of treating results as isolated outcomes, the synthesis focuses on how changes in routines, environments, and behaviors interact over time to shape children's functioning and well-being, and on how these interactions can inform clinical interpretation.

This methodological approach has clear limitations. It does not aim to estimate prevalence or establish causal relationships, and the included literature reflects heterogeneity in study designs, measures, and populations. These constraints are inherent to the objective of producing a synthesis that is clinically useful across disciplines. By explicitly defining scope, time boundaries, and selection criteria, the methodology is intended to support transparent interpretation while remaining consistent with the developmental and functional orientation that guides the review.

Chapter 8

Synthesis of the available evidence

The body of evidence reviewed depicts a complex and uneven landscape of changes in child health, daily habits, and well-being following sustained social disruption. Rather than converging on a single explanatory framework, the literature reveals a set of recurrent patterns that cut across physical, emotional, and behavioral domains. These patterns are visible at the population level, yet they unfold differently depending on age, family context, and living conditions, which makes simple generalization misleading.

Understanding these findings requires attention not only to what changed, but to how those changes affect children's everyday functioning. Many of the reported alterations become clinically meaningful through their impact on participation in daily life, such as movement, learning, play, and social engagement, rather than through isolated clinical indicators taken in abstraction. Functional consequences therefore provide a more coherent entry point for interpretation than symptom counts alone.

In the following sections, we bring together evidence related to movement and physical activity, psychological well-being, daily habits, and persistent symptoms. The focus is placed on areas where different strands of the literature converge, as these points of overlap offer the most useful guidance for clinical reasoning and help clarify how diverse changes interact within children's lived experience.

8.1 Physical activity and sedentary patterns

Across different regions and age groups, the literature consistently reports a decline in moderate to vigorous physical activity among children and adolescents during periods of disrupted routines, accompanied by a parallel increase in sedentary behavior. Evidence synthesized from multiple contexts shows that these changes did not end with the most restrictive phases of disruption. In many cases, reduced activity levels persisted over time, indicating that temporary adjustments evolved into more stable pat-

terns of daily life rather than resolving on their own (Neville et al., 2022).

When viewed from a functional standpoint, the implications of reduced habitual movement extend well beyond traditional fitness indicators. Lower levels of physical activity are linked to diminished tolerance to effort, alterations in sleep continuity, and decreased engagement in spontaneous play. These consequences do not manifest uniformly. Children's responses vary according to age, previous activity habits, and the availability of supportive environments, including access to outdoor spaces and organized opportunities for movement.

Some children were able to reestablish prior activity patterns within a relatively short period, while others experienced more sustained reductions that continued to shape daily functioning. This heterogeneity challenges generalized assumptions about deconditioning and highlights the need for individualized assessment. Interpreting changes in activity through the lens of each child's everyday context allows clinicians to distinguish between transient adaptations and functional difficulties that may require targeted support.

8.2 Psychological well-being in children and adolescents

The literature on psychological well-being points to an increase in emotional manifestations among children and adolescents during periods of social disruption. Expressions related to anxiety and low mood appear more frequently, although not in a uniform way. Reviews that combine data from multiple countries describe a higher overall emotional symptom burden when compared with earlier reference periods. At the same time, they emphasize wide variability across studies and contexts, which limits direct comparison and requires cautious interpretation given differences in assessment tools, sampling methods, and timing of data collection (Racine et al., 2021).

Evidence from longitudinal and systematic analyses suggests that emotional well-being is strongly influenced by the duration and intensity of stressors, as well as by the resources available within families and educational settings. Emotional changes often emerge in everyday behavior rather than as clearly delineated clinical syndromes. Increased irritability, loss of motivation, and withdrawal from social interaction are common ways in which distress becomes visible in daily life.

From a clinical perspective, the significance of these manifestations lies primarily in their impact on functioning. Difficulties become relevant when they interfere with learning, social participation, or the child's capacity to regulate emotions across daily demands. Approaching emotional symptoms through a functional lens supports assess-

ment strategies that attend to everyday regulation and performance, rather than relying exclusively on categorical diagnostic thresholds. This orientation allows clinicians to differentiate between transient adaptive responses and more persistent difficulties that warrant targeted intervention (Kauhanen et al., 2022).

8.3 Daily habits, screen use, and displacement of protective behaviors

Changes in daily habits appear consistently across the literature as a key element in understanding recent shifts in child functioning. Increased screen use, disrupted sleep routines, and prolonged sedentary time tend to cluster rather than occur in isolation. Together, these patterns influence how children regulate their bodies and emotions throughout the day. Importantly, the functional impact of screen exposure seems to depend less on absolute duration and more on what activities are displaced as a result.

When screen use replaces sleep, physical movement, or direct social interaction, its effects become more evident in everyday functioning. Reduced sleep continuity, lower tolerance to effort, and difficulties sustaining attention are frequently reported in these contexts. In contrast, screen use that is integrated into a balanced routine, with preserved opportunities for movement and rest, shows a different functional profile. This distinction helps explain why similar levels of exposure may be associated with very different clinical presentations.

Guidance documents repeatedly emphasize the need to situate screen use within the broader organization of daily life. Rather than focusing exclusively on fixed time limits, attention is directed toward content, timing, and shared use within family routines (Chassiakos et al., 2016). For younger children, international recommendations underline the close interdependence between movement, sedentary behavior, and sleep, reinforcing the view that daily habits operate as interconnected systems rather than as separate behaviors (World Health Organization, 2019). This integrated perspective is consistent with clinical observations linking routine disorganization to functional difficulties and supports interventions aimed at restoring balance instead of targeting single habits in isolation.

8.4 Considerations regarding persistent postinfectious symptoms

A part of the pediatric literature addresses symptoms that persist after confirmed or suspected viral infection. Fatigue, headaches, sleep disruption, and difficulties with concentration are among the most frequently reported complaints. Their prevalence and duration vary widely across studies and clinical settings. This variability reflects not only differences in case definitions and follow-up periods, but also the challenge of disentangling postinfectious processes from the effects of sustained contextual stress and disrupted daily routines when both are present over time (Borch et al., 2022; Esposito et al., 2022).

Across this body of work, authors consistently highlight the limits of attributing symptoms to a single explanatory pathway. In practice, biological recovery, habit reorganization, emotional load, and environmental conditions often evolve simultaneously. For this reason, emphasis is placed on differential assessment that integrates medical history with functional impact and everyday context. The clinical question shifts from identifying a single cause to understanding how symptoms affect participation, tolerance to effort, and return to usual activities.

A functional and longitudinal approach allows clinicians to observe how symptoms change over time, adjust expectations, and refine intervention strategies as recovery unfolds. Rather than forcing early conclusions, this perspective supports ongoing monitoring and proportionate guidance. Within this framework, persistent symptoms are best understood as part of a dynamic interaction between biological processes, daily routines, and environmental demands. It is this interaction, rather than any single factor, that shapes individual trajectories of functioning and recovery.

Chapter 9

Discussion

The synthesis developed in this review supports an understanding of recent changes in child health as part of a broader reorganization of developmental environments, rather than as the result of isolated clinical factors. Across physical, emotional, and behavioral domains, the literature converges on the role of altered routines, relational contexts, and everyday environments in shaping children's functioning. These influences seldom act on their own. They accumulate, interact, and gradually reshape daily life in ways that are uneven and often difficult to anticipate. Interpreting these changes therefore calls for moving beyond event-based explanations and toward a developmental perspective that takes cumulative experience seriously.

From a clinical point of view, the most salient feature is not the presence of specific symptoms, but the way everyday functioning is affected across settings. Reduced tolerance to physical effort, difficulties regulating emotions, attentional strain, and changes in social engagement frequently appear together. They are rarely reported as separate concerns. This clustering reflects the close interdependence between movement habits, emotional regulation, and the organization of daily routines. The available evidence suggests that many of these manifestations can be understood as adaptive responses to altered environments, rather than as clear markers of discrete pathology. This distinction matters in practice, since it invites careful consideration of proportionality and context before symptoms are framed within fixed diagnostic categories.

The marked heterogeneity described across studies further challenges generalized assumptions. Children's developmental trajectories following periods of disruption varied widely according to age, family resources, environmental supports, and preexisting routines. Factors such as access to outdoor spaces, continuity of caregiving, and opportunities for social interaction consistently appear as shaping outcomes in meaningful ways. These observations align with developmental models that emphasize environmental scaffolding as a central support for regulation and resilience. In clinical work, they reinforce the need for individualized assessment that situates observed behav-

iors within the child's lived context, rather than judging them against abstract norms alone.

Integrating movement-related and psychological perspectives proves especially valuable when interpreting functional change. Evidence linking reduced physical activity with sleep disruption, heightened emotional reactivity, and reduced engagement suggests that bodily and emotional regulation are tightly connected. Addressing one domain while neglecting the others is unlikely to produce sustained improvement. Approaches that aim to restore balance across daily habits appear better suited to supporting recovery of functioning over time. This interpretation is consistent with broader recommendations that highlight the interdependence of physical activity, sedentary behavior, and sleep as foundational elements of child health (World Health Organization, 2019).

The literature addressing persistent postinfectious symptoms adds an additional layer of complexity. While a subset of children experience prolonged difficulties after infection, the overlap between these manifestations and those associated with disrupted routines and psychosocial stress makes attribution challenging. The evidence reviewed favors a cautious stance that prioritizes functional assessment and observation over time rather than rapid labeling. Such an approach helps limit overmedicalization while ensuring that children whose daily functioning is genuinely affected receive appropriate attention and follow-up (Borch et al., 2022; Esposito et al., 2022).

Taken together, these findings support a shift in pediatric practice toward integrative clinical reasoning grounded in development and functionality. Instead of searching for single explanations, clinicians are encouraged to consider how bodily conditioning, emotional regulation, daily habits, and environmental conditions interact in shaping well-being. This perspective does not replace medical or psychological expertise. It situates them within a broader frame that better reflects the realities of children's everyday lives. The strength of an integrated approach lies less in theoretical innovation than in its practical implications. When assessment and intervention are organized around functional goals, clinical responses tend to become more coherent and proportionate, supporting children's adaptation and recovery while remaining attentive to individual differences and contextual constraints.

Chapter 10

Clinical and preventive implications

Translating an integrated reading of the evidence into clinical and preventive practice calls for approaches that combine clear structure with room for adjustment. When children present with functional difficulties that span physical, emotional, and behavioral domains, interventions tend to be more effective when they remain proportionate, realistic, and consistent across everyday settings. Rather than focusing on isolated symptoms, this perspective draws attention to how routines, environments, and regulatory demands interact over time and shape children's functioning.

In clinical practice, functional difficulties are often first recognized through changes in everyday performance rather than through discrete diagnostic findings. Children may tire more quickly during physical activity, struggle to sustain attention during school tasks, become more irritable, or withdraw from play and peer interaction, even when physical examination and complementary studies do not reveal abnormalities. Identifying these patterns early allows clinicians to respond before limitations become entrenched or are prematurely attributed to a single explanatory domain.

From a preventive standpoint, this orientation supports guidance that emphasizes the gradual reorganization of daily habits. Attention to movement opportunities, sleep routines, and screen use becomes most useful when recommendations are adapted to family resources and educational demands. Coordination between pediatric, movement-related, and psychological perspectives helps ensure that guidance is consistent and manageable, reducing the risk of fragmented advice that may overwhelm families. When clinical recommendations are aligned with the child's developmental stage and everyday context, adherence improves and changes are more likely to be sustained, with functionality and participation remaining central goals of care.

10.1 Interdisciplinary assessment centered on functionality

Clinical assessment gains depth when functionality is placed at the center of evaluation and used as the main reference for interpreting symptoms and behaviors. In pediatric settings, this means examining how children manage daily activities such as attending school, participating in play and movement, sustaining social interaction, and regulating emotions in response to routine demands. A functional focus makes it possible to identify meaningful limitations even when standard diagnostic findings are inconclusive, supporting earlier and more context-sensitive intervention.

Centering assessment on functionality also promotes coordination across clinical perspectives. Medical evaluation can relate physiological findings to patterns of daily participation. Movement-oriented assessment can identify deconditioning or motor inefficiencies that limit engagement. Psychological evaluation can clarify how stress, emotional regulation, and relational dynamics influence behavior and adherence. When these perspectives align around shared functional goals, assessment becomes more coherent and more directly applicable to clinical decision-making (World Health Organization, 2019).

10.2 Gradual and sustainable intervention strategies

Interventions implemented after periods of disrupted routines tend to be more effective when they prioritize gradual change and long-term sustainability, rather than rapid correction. Many children respond better to a progressive return to physical activity that allows tolerance to effort to rebuild over time while preserving confidence and enjoyment. In a similar way, reestablishing consistent sleep routines and predictable daily schedules often produces regulatory effects that extend across physical and emotional domains.

From a preventive perspective, modest adjustments in daily habits can lead to meaningful improvements in functioning. Supporting regular movement across the day, encouraging variation in posture and activity, and promoting a balanced relationship with digital media help restore regulatory patterns without introducing rigid or unrealistic demands. When interventions are adapted to the child's developmental stage and family circumstances, they are more likely to be sustained and to support a stable recovery of functional engagement.

10.3 Guidance for families and educational contexts

Families and educational settings are central in shaping children's everyday experiences and in translating clinical recommendations into daily practice. Clear and consistent guidance helps caregivers understand the reasoning behind proposed changes and highlights how routines, movement, and emotional support work together to sustain well-being. Framing recommendations around functionality, rather than restriction or prohibition, encourages collaboration and reduces resistance.

Schools and educational environments also offer important opportunities for preventive action. Supporting regular movement, facilitating social interaction, and maintaining predictable schedules within the school day can reinforce regulatory processes and participation. Collaboration among clinicians, families, and educators strengthens consistency across settings, allowing children to encounter aligned expectations and support. This coordination is especially relevant for children with persistent functional difficulties, as it promotes continuity of care and helps consolidate adaptive habits across the environments in which children grow and learn.

Chapter 11

Conclusions

This integrative review indicates that the changes observed in child health after a period of sustained social disruption are more accurately understood as the result of interacting shifts in daily routines, environments, and regulatory processes than as isolated clinical phenomena. Across the literature, recurring modifications in movement patterns, everyday habits, emotional regulation, and social engagement emerge along heterogeneous trajectories shaped by developmental stage, family context, and access to environmental resources. Viewed together, these findings support an understanding of child health that treats development as a situated and evolving process, with functionality emerging as a central point of clinical reference.

Functional limitations often exert a greater impact on children's daily lives than discrete diagnostic findings. Difficulties in sustaining participation in school, play, social interaction, or self-regulation tend to be the issues that bring families to consultation and that most directly affect well-being. When clinical reasoning is organized around functionality, responses are more likely to remain proportionate and better aligned with underlying patterns of habit organization, bodily conditioning, and emotional regulation. This orientation helps avoid both overmedicalization and premature psychological labeling, while keeping attention focused on what meaningfully shapes everyday experience.

The integration of pediatric, movement-related, and psychological perspectives offers a clear practical advantage. Clinical integration does not require dissolving disciplinary boundaries. It allows each field to contribute its specific expertise within a shared focus on the child's lived experience and developmental needs. This alignment supports greater coherence in assessment and intervention, promotes consistent guidance for families and educators, and facilitates gradual and sustainable recovery of functioning.

From a preventive standpoint, the findings underline the importance of restoring and maintaining balanced daily routines. Regular movement, adequate sleep, and op-

portunities for social interaction emerge as foundational elements of well-being across contexts. Interventions grounded in these principles are adaptable to diverse settings and responsive to individual trajectories of recovery. They are also consistent with international guidance emphasizing the close interdependence of physical activity, sedentary behavior, and sleep as pillars of health.

Addressing child health after sustained social disruption therefore calls for clinical perspectives that integrate without becoming diffuse and remain structured without becoming rigid. By keeping functionality, development, and context at the center of care, practitioners are better positioned to support children's well-being while acknowledging the complexity of their experiences. This approach provides a durable foundation for both clinical practice and preventive strategies within social environments that continue to change.

References

Arana, M. N., & Torres Ponce, M. E. (2021). *Digital medicine in health emergencies: Redefining clinical and legal responsibility*. Zenodo. https://doi.org/10.5281/zenodo.17985387

Borch, L., Holm, M., Knudsen, M., Ellermann-Eriksen, S., & Hagstrøm, S. (2022). Long COVID symptoms and duration in SARS-CoV-2 positive children: A nationwide cohort study. *European Journal of Pediatrics, 181*(4), 1597–1607. https://doi.org/10.1007/s00431-021-04345-z

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

Chassiakos, Y. L. R., Radesky, J., Christakis, D., Moreno, M. A., Cross, C., & Council on Communications and Media. (2016). Children and adolescents and digital media. *Pediatrics, 138*(5), e20162593. https://doi.org/10.1542/peds.2016-2593

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129–136. https://doi.org/10.1126/science.847460

Esposito, S., Principi, N., Azzari, C., Cardinale, F., Di Mauro, G., Galli, L., & Italian Intersociety Consensus Group. (2022). Italian intersociety consensus on management of long COVID in children. *Italian Journal of Pediatrics, 48*, 42. https://doi.org/10.1186/s13052-022-01233-6

Kauhanen, L., Wan Mohd Yunus, W. M. A., Lempinen, L., Peltonen, K., Gyllenberg, D., Mishina, K., & Sourander, A. (2022). A systematic review of the mental health changes of children and young people before and during the COVID-19 pandemic. *European Child & Adolescent Psychiatry, 32*(6), 995–1013. https://doi.org/10.1007/s00787-022-02060-0

Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden,

A., & Crawley, E. (2020). Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry, 59*(11), 1218–1239.e3. https://doi.org/10.1016/j.jaac.2020.05.009

Neville, R. D., Lakes, K. D., Hopkins, W. G., Tarantino, G., Draper, C. E., Beck, R., & Madigan, S. (2022). Global changes in child and adolescent physical activity during the COVID-19 pandemic: A systematic review and meta-analysis. *JAMA Pediatrics, 176*(9), 886–894. https://doi.org/10.1001/jamapediatrics.2022.2313

Racine, N., McArthur, B. A., Cooke, J. E., Eirich, R., Zhu, J., & Madigan, S. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. *JAMA Pediatrics, 175*(11), 1142–1150. https://doi.org/10.1001/jamapediatrics.2021.2482

Sirajudeen, M. S., Alzhrani, M., Alanazi, A., Alqahtani, M., Waly, M., Unnikrishnan, R., . . . & Al-Hussinan, N. M. (2022). Prevalence of text neck posture, smartphone addiction, and its association with neck disorders among university students in the Kingdom of Saudi Arabia during the COVID-19 pandemic. *PeerJ, 10*, e14443. https://doi.org/10.7717/peerj.14443

Tremblay, M. S., Carson, V., Chaput, J.-P., Connor Gorber, S., Dinh, T., Duggan, M., & Zehr, L. (2016). Canadian 24-hour movement guidelines for children and youth: An integration of physical activity, sedentary behaviour, and sleep. *Applied Physiology, Nutrition, and Metabolism, 41*(6 Suppl. 3), S311–S327. https://doi.org/10.1139/apnm-2016-0151

World Health Organization. (2019). *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*. World Health Organization.